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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,937	11/26/2003	Trausti T. Kristjansson	M61.12-0577	9636

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WESTMAN CHAMPLIN (MICROSOFT CORPORATION)
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402-3244

EXAMINER	
VO, HUYEN X	

ART UNIT	PAPER NUMBER
2626	

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07/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/722,937	KRISTJANSSON ET AL.	
	Examiner	Art Unit	
	HUYEN X. VO	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6 and 8-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6 and 8-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11/26/2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. During a telephone conversation with Mr. Theodore Magee on 7/1/2008, examiner indicated that the claims would be allowable. However, upon further consideration of the prior art provided by the applicant, the indication of allowable claims are now withdrawn in favor of a new non-final office action.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 12-19 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

4. Claims 12-19 are drawn to a "program" per se as recited in the preamble and as such is non-statutory subject matter (the specification defines the term "computer storage medium" as "RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, **or any other medium which can be used to store the desired information and which can be accessed by computer 110**" (paragraph 17), "**or other optical media**" (paragraph 19), and "**and the like**" (paragraph 19). The terms "or any other medium", "or other optical media", and "and the like" suggest that the medium can be

carrier waves or communication media that are non-statutory subject matters). See MPEP § 2106.IV.B.1.a. Data structures not claimed as embodied in computer readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention, which permit the data structure's functionality to be realized. In contrast, a claimed computer readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory. Similarly, computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program's functionality to be realized.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3-5, 8-11, 12-16, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey et al. (Publication entitled "ALGONQUIN: Iterating Laplace's Method to Remove Multiple Types of Acoustic Distortion for Robust Speech Recognition", submitted by applicant) in view of IEEE Transaction on Acoustics, Speech, and Signal Processing Vol. ASSP-27, No. 2, April 1979, pages 114-120 (submitted by the applicant), herein referred as IEEE Publication.

7. Regarding claim 1, Frey et al. disclose a method of identifying a clean speech signal from a noisy speech signal, the method comprising:

identifying a set of log-magnitude frequency values for each of a plurality of frames that represent the noisy speech signal (*2nd page, left column; noisy speech signal in converted into log-magnitude frequency values; equations 5-6*);

determining parameters of at least one posterior probability distribution of at least one component of a clean signal value based on the set of filtered noisy values without applying a frequency-based transform to the set of filtered noisy values, the posterior probability distribution providing the probability of a log-magnitude frequency value for a clean speech signal given a filtered noisy value (*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; "computing posterior responsibilities of the component indexed by s"; and deriving the minimum squared error estimate of the clean speech*);

using the parameters of the posterior probability distribution to estimate a set of log-magnitude frequency values for a clean speech signal (*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; plug equation 13 into equation 14 and equation 14 into equation 8 to obtain clean speech signal*); and

using the log-magnitude values for the clean speech signal to produce an output clean speech signal (*see equation 8*).

Frey et al. fail to specifically disclose the step of filtering the log-magnitude frequency values of the noisy speech signal to smooth the log-magnitude frequency values over time to form filtered noisy values. However, IEEE Publication teaches the step of averaging spectral magnitude values of noisy speech signal (*step D, page 116; "averaging" is the same process as "filtering" or smoothing the signal*).

Since Frey et al. and IEEE Publication are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Frey et al. by incorporating the teaching of IEEE Publication in order to reduce the variance of the noise spectral estimate.

8. Regarding claim 12, Frey et al. disclose a computer-readable medium having computer-executable instructions for performing steps comprising:

determining a posterior probability based on the filtered values, wherein a frequency-based transform is not applied before the filtered values are used to determine the posterior probability and wherein the posterior probability provides the probability of the frequency values for a clean speech signal given the filtered values

(*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; "computing posterior responsibilities of the component indexed by s"; and deriving the minimum squared error estimate of the clean speech; the IFFT is applied on frequency values of a clean speech to bring the clean speech signal to the time domain for output*); and

using the posterior probability to estimate a frame of a clean speech signal (*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; plug equation 13 into equation 14 and equation 14 into equation 8 to obtain clean speech signal*); and

using the frame of the clean speech signal to produce an output clean speech signal (*see equation 8*).

Frey et al. fail to specifically disclose the step applying values that represent frames of a noisy speech signal to time-based filtering to produce filtered values representing noisy speech. However, IEEE Publication teaches the step of averaging spectral magnitude values of noisy speech signal (*step D, page 116; "averaging" is the same process as "filtering" or smoothing the signal*).

Since Frey et al. and IEEE Publication are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Frey et al. by incorporating the teaching of IEEE Publication in order to reduce the variance of the noise spectral estimate.

9. Regarding claim 13, Frey et al. further disclose wherein estimating a frame of clean speech signal comprises estimating log-magnitude frequency values for the frame of clean speech signal (*2nd page, left column*).

10. Regarding claims 3 and 14, Frey et al. further disclose taking the exponent of each of the log-magnitude values in the set of log-magnitude values to produce a set of magnitude values for the clean speech signal (*equation 5*).

11. Regarding claims 4 and 15-16, Frey et al. further inherently disclose transforming the set of magnitude values for the clean speech signal into a set of time domain values representing a frame of the clean speech signal (*transforming the clean signal into a time domain for playback is inherent in the system*), and transforming the magnitude values comprises performing an inverse Fast Fourier Transform (*transforming the clean signal into a time domain for playback is inherent in the system*).

12. Regarding claim 5, Frey et al. further disclose transforming a frame of the noisy speech signal into the frequency domain to form the frequency values for the noisy speech signal (*2nd page, left column, equations 2-4*).

13. Regarding claim 9, Frey et al. further inherently disclose the method of claim 5 wherein transforming a frame of the noisy speech signal into the frequency domain comprises producing a set of more than one hundred frequency magnitude values (*2nd page, left column; multiple frames includes multiple data points will yields multiple frequency magnitude values; and the number is big in signal process*).

14. Regarding claims 10-11 and 18-19, Frey et al. further disclose wherein determining the parameters of at least one posterior probability distribution comprises utilizing an iterative process to determine the parameters (*equations 13-14, iterative process*), and wherein determining parameters of at least one posterior distribution comprises determining parameters for each of a set of mixture components (*referring to section 3*).

15. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey et al. (Publication entitled "ALGONQUIN: Iterating Laplace's Method to Remove Multiple Types of Acoustic Distortion for Robust Speech Recognition", submitted by applicant) in view of IEEE Transaction on Acoustics, Speech, and Signal Processing Vol. ASSP-27, No. 2, April 1979, pages 114-120 (submitted by the applicant), herein referred as IEEE Publication, and further in view of Ephraim (IEEE Publication, from IDS).

16. Regarding claim 6, Frey et al. fail to specifically disclose the method of claim 5 wherein transforming a frame of the noisy speech signal into the frequency domain further comprises generating a set of frequency phase values and wherein transforming the set of magnitude values for the clean speech signal into a set of time domain values further comprises using the set of frequency phase values to transform the set of magnitude values (*left column, second paragraph on page 730 and equation 33 on page 732*). However, Ephraim teaches generating a set of frequency phase values and

wherein transforming the set of magnitude values for the clean speech signal into a set of time domain values further comprises using the set of frequency phase values to transform the set of magnitude values (*left column, second paragraph on page 730 and equation 33 on page 732*).

Since Frey et al. and Ephraim are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Frey et al. by incorporating the teaching of Ephraim in order to preserve the original phase so that clean speech signal with the original phase can be reconstructed.

17. Regarding claim 17, Frey et al. fail to specifically disclose wherein performing an inverse Fast Fourier Transform further comprises using phase values generated by converting the frame of the noisy speech signal from the time domain to the frequency domain. However, Ephraim teaches performing an inverse Fast Fourier Transform further comprises using phase values generated by converting the frame of the noisy speech signal from the time domain to the frequency domain (*left column, second paragraph on page 730 and equation 33 on page 732*).

Since Frey et al. and Ephraim are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Frey et al. by incorporating the teaching of Ephraim in order to preserve the original phase so that clean speech signal with the original phase can be reconstructed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUYEN X. VO whose telephone number is (571)272-7631. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Huyen X Vo/ 7/1/2008
Primary Examiner, Art Unit 2626

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	10/722,937	KRISTJANSSON ET AL.	
	Examiner	Art Unit	
	HUYEN X. VO	2626	